Institutional Insecurity

Kong Bo

The Key to Energy Security

Already the world's second biggest energy consumer, China is presently on track to become the world's largest user of energy by the year 2030.[1] This phenomenon has kindled a profusion of literature to address how China will meet this demand and the affect it will have on global energy security. Current analyses overwhelmingly focus on the notion that energy security is based on the assurance of reliable energy supply at a reasonable price, invoking a disproportionate emphasis on the security of China's oil supply. This is largely a result of the psychological elements arising from the uncertainty of guaranteed oil supplies for China. In reality, however, oil imports are merely one dimension of China's energy security concerns and not even the most important. Far less attention has been given to the more obscure though imperative factor of China's domestic energy institutions and their role in meeting the country's energy security challenges both at home and abroad.[2]

Energy institutions are essential because they are the instruments that shape, govern and regulate a country's energy economy. Their structure determines the performance of a nation's energy industry and its ability to safeguard its

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energy security. Fundamentally, this ability boils down to whether institutions are able to produce and implement a coherent national energy strategy as well as foster an industry that can meet a country's growing energy needs. The parameters of China's energy institutions do not hold a high degree of uncertainty (unlike the supply of oil from abroad), however, their efficient functioning is difficult to accomplish.

In fact, the evolution of China's energy institutions has largely crippled their ability to establish and carry out a national energy strategy. Moreover, under the nation's current institutional structure, the energy industry cannot meet the challenge of securing the country's increasingly complex and burgeoning domestic energy demand. Hence, restructuring China's energy institutions in a way not previously accomplished is absolutely vital if China is to successfully address its energy security needs.

Confusing Beginnings: China's Energy Policy-Making System

Today, all aspects of China's energy institutional make-up show a high degree of organizational confusion that is largely a legacy of its complex origins. China's modern energy industry was modeled in part on the economic structure of the former Soviet Union and in part adapted to China's unique environment. The result was a perplexing array of both vertical and horizontal institutions. Vertical institutions (*tiaotiao*) included commissions such as the State Planning Commission (SPC) and the State Economic and Trade Commission (SETC) that integrated energy policies with other facets of the economy. Also in this category were line ministries in charge of specific energy industries such as coal, power, petroleum and nuclear industries. All of these contained both the central and local level government organs. The horizontal institutions (*kuaikuai*) were comprised of other non-energy ministries such as the Ministry of Finance (MOF) and the Ministry of Railways (MOR) but still maintained responsibility for some segment of the country's energy policies at central and local levels.

Today, all aspects of China's energy institutional make-up show a high degree of organizational confusion.

Vertical institutions were designed to ensure the government's central control of these key industries while the horizontal institutions were largely

the influence of the energy governance structure of the USSR. The latter purposely separated energy exploration, production, transportation, refinery, distribution and trade into different segments, creating a hodgepodge of institutions characterized by fragmentation rather than integration.[3] The energy policies that were crafted under these fragmented energy institutions demonstrated a lack of focus, consistency, and coherence. As the country moved away from a planned economy to a market economy both the *tiaotaio* and *kuaikuai* institutions have gone through a series of transformations that have manifested themselves in two respects: the restructuring of the country's energy industries and institutional reform.

Hard Path to Energy Industry Reform

Since its inception in 1949, China's energy industry has experienced multiple rounds of restructuring. These phases were characterized by conflicting measures and even frequent reversals, reflecting the government's vacillation between strong central control and greater deregulation of the country's energy sector.[4]

Except for three brief periods during which a single institution was put in charge of China's energy strategy, the country has had no central energy policy-maker, devolving authority to individual line ministries who took charge of energy policies within their specific industrial sectors. In the absence of a central decision-making body, the SPC became the default institution overseeing energy policy while regulatory authority was turned over to the SETC, all the while line ministries maintained a high degree of autonomy. Consequently, a consistent and long-term energy strategy at the national level was never in existence and instead policy was driven by each individual energy sector.

Beginning in the early 1980s, the Chinese government began divesting itself from energy production by creating state-owned energy companies and eliminating special line ministries. In the oil sector, the China National Offshore Oil Corporation (CNOOC) and the China Petrochemical Corporation (Sinopec) were set up to supervise and conduct offshore development and downstream business (i.e., refinery and distribution) respectively. Similarly, the China National Petroleum Corporation (CNPC) replaced the Ministry of Petroleum Industry (MPI) in 1998, acquiring both its administrative power over onshore exploration and production (E&P) as well as inheriting its staff and an entrenched organizational culture.

Table 1 Evolution of the Vertical Institutions (*tiao tiao*) in China's Energy Industry

	Energy institutions at national level	Central energy policy-maker
1949-1955	Ministry of Fuels and Power	Yes
1955-1969	Ministry of Coal Industry Ministry of Electric Power Ministry of Petroleum Industry Second Ministry of Machine-Building Industry	No
1970-1975	Ministry of Fuels and Chemical Industries	Yes
1975-1987	Ministry of Coal Industry Ministry of Water Resources and Electric Power Ministry of Petroleum Industry Ministry of Nuclear Industry	No
1988-1992	Ministry of Energy	Yes
1993-1998	Ministry of Electric Power (abolished in 1998) Ministry of Coal Industry (abolished in 1998) State-owned energy companies in the petroleum sector and nuclear sector	No
1998 to present	All line ministries were dissolved; State-owned energy companies were established in each sub-energy sector	No

As a result, the vertical management system virtually remained intact except under the name of state-owned oil companies (SOEs). Moreover, after these companies went public in 2001 and 2002, they had taken on multiple identities as state-owned energy companies, publicly listed companies, and as industry administrators. These conflicting interests hindered the efficient functioning of China's oil sector by creating fertile ground for market monopoly which the three oil SOEs came to enjoy and empowered them to forestall any reform measures working against their interests. Consequently, reforms in the oil sector have created a market structure where the oil SOEs have sufficient power to preserve the status quo in their favor yet they fail in effectively safeguarding the country's energy security.

Decentralization of Power and Coal Industries

The restructuring of China's power industry resembles that of the oil sector. After the Ministry of Energy was abolished in 1993, authority over China's power industry was redistributed to the Ministry of Electric Power and various forms of the State Planning Commission.[5] Power industry investment and development activities finally landed with the newly created

State Power Corporation of China (SPCC) in 1997.[6] To enhance efficiency, at the end of 2002 the SPCC was split into five power generation companies, two grid companies and four services companies.[7] As with the oil sector, these centrally controlled state-owned power companies also exercise vertical control over their regional branches.

Numerous smaller companies were also established, some of which passed to local governments and some run as independent power producers (IPPs).[8] By the end of 2002, although the SPCC controlled 90 percent of the country's transmission assets, it generated only 46 percent of the country's total power output.[9] In response, the government instituted the State Electricity Regulatory Commission (SERC) to regulate the complex hybrid of decentralized local power companies and IPPs on the one hand and vertically managed state-owned companies on the other.

The power shortages that have taken place over the last three years attest to the failure of the overhaul launched in 2002 and illustrates the impact of a malfunctioning power sector on China's energy security. Instead of promoting competition, the separation of power generation from transmission interests in reality concentrated these assets in the hands of state grid companies, thereby cementing their monopoly and hampering the formation of a viable power market. Moreover, because provincial grid companies often base their expansion on local economic development and local power needs, their proliferation has made it impossible for the country to establish a nationwide electricity distribution system. Finally, administrative authority remains in the hands of the NDRC, whose approval is necessary for all power development investment. However, it does not possess sufficient local knowledge, impeding the timely processing of project applications. Consequently, developments in the country's power sector fall victim to enduring institutional flaws, jeopardizing the country's adequate supply of electricity.

The recent power shortages illustrate the impact of a malfunctioning power sector on China's energy security.

Reshuffling of the coal industry, however, has taken on a different nature. Unlike the oil or power sector, the participation of the private sector, particularly the township and village coal mines, has been substantial. At their peak in 1996, these small coal mines produced 45.6 percent of the country's

total coal.[10] By contrast, in the same year, the state mines owned and operated by the Ministry of Coal Industries (MCI) accounted for only 38 percent of the country's production.[11] As these small coal mines boost local economies, generate employment, and supplement tax revenues, their relationships with local governments are often symbiotic. Support and protection are provided by local governments in exchange for economic benefits. Consequently, companies in the coal industry far outnumber those in the oil and power sectors, while local governments have a far higher degree of control. This process was accelerated in 1998 when the MCI was abolished and all 94 of the large state-owned coal mine companies were devolved to various local governments.[12] Hence, the vertical institutions in the coal sector that used to be run by the MCI are now entirely gone and in their place has evolved a glut of local and small coal companies, with the total number exceeding 28,000 in 2002.[13]

This excess of small coal mines is also the primary culprit for massive death tolls, appalling health safeguards, dangerous pollution levels and poor resource utilization in China's coal industry. In a country where 'coal is king', such acute decentralization undoubtedly works against the formation of a coherent energy plan. Furthermore, small coal mines, many of them illegal, often operate outside the country's energy statistical collection system, leading to wide margins or error on national data figures and complicating the country's energy policy-making.[14]

Government's Turn at Energy Policy Reform

Reforms have not been restricted to the energy industry in China. A dizzying succession of government restructurings has also negatively impacted the nation's energy governance. Since the beginning of China's reform period alone, no less than five reorganizations have been executed, which have created, abolished, and reshuffled the structure, function, and bureaucratic rank of several ministries and up to 100 ministerial-level institutions.[15] The latest of these and one of the most comprehensive to date was the massive institutional reorganization of 2003.

This multiple restructuring has produced two significant fallouts. Most importantly is the affect of numerous and irrational reorganizations on the National Development and Reform Commission (NDRC), the institution tasked with crafting and regulating the country's overall energy development.

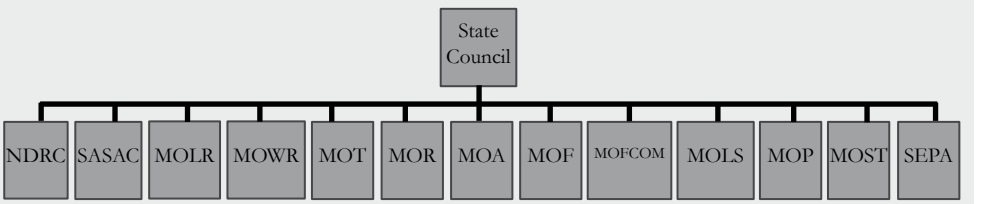
The NDRC now has the sole authority for strategic planning and regulation (e.g. approving major investment projects and setting energy prices) which effectively makes it both the policymaker and watch dog of the country's energy industry. [16] Even if this was a rational set-up, which it is not, it is an impossibly large portfolio given the commission's limited staff and resources.

A second consequence of the bureaucratic consolidation of 2003 is the redistribution of China's energy policymaking tasks into two commissions and eleven ministries. The portfolios of these thirteen institutions often overlap and yet each agency maintains equal bureaucratic rank, creating further obstruction in the decision-making process. Given the collapse of the vertical management system in China's energy institutions, the diffusion of authority over energy policy among these 13 parallel ministries only worsens the fragmentation of China's energy policymaking at the national level. These problems illustrate the dysfunctional legacy of the traditional vertical (*tiaotiao*) institutional framework.

Indeed, the reforms of China's energy institutions at both the vertical and horizontal levels have had varied effects on how the country's energy industry is governed today. The former vertical energy institutions have almost entirely collapsed in the coal industry, remain partially functioning in the power industry but are largely intact in the oil industry. Horizontal energy institutions, on the other hand, are still generally extant albeit under different names and configurations.

From a macro level, this process reveals enormous path dependence. That is, the new look of China's energy institutions are largely dependent on its past structure and function.[17] As a result, the initial fragmentation of the system has only been magnified through the reforms over the past decades, with the authority over energy planning and policy-making even more incoherent than before. Moreover, this fragmentation has worsened at both the national and local levels. The example of state-owned enterprises is telling. At the national level, they must follow instruction from the State Asset Supervisory & Administration Commission (SASAC), the NDRC as well as other ministries. At the local level they must answer to three conflicting groups: local branches of the 11 ministries, local branches of NDRC, and the upper hierarchy of the state-owned enterprise. In an era of growing dependence on foreign energy, the country's policy-making system is under strain, carrying ominous implications for meeting the country's energy security needs.

Chart 1 Horizontal energy institutions in China (*kuai kuai*)



NDRC—National Development and Reform Commission
SASAC—State Asset Supervisory & Administration Commission
MOLR—Ministry of Land and Resources
MOWR—Ministry of Water Resources
MOT—Ministry of Transportation
MOR—Ministry of Railways
MOA—Ministry of Agriculture
MOF—Ministry of Finance
MOFCOM—Ministry of Commerce
MOLS—Ministry of Labor and Social Security
MOP—Ministry of Personnel
MOST – Ministry of Science and Technology
SEPA—State Environmental Protection Agency

Portfolios of different horizontal energy institutions on energy[18]

NDRC	Responsible for planning the long-term energy development in China and implementing its annual energy development target. In addition, it is also tasked to balance the country's energy development with other sectors of the economy, set energy prices and approve investments in the energy sector both at home and abroad.
SASAC	Supervises the state-owned assets of all centrally owned energy companies and charts their reform. It also appoints corporate executives of large state-owned energy companies under its watch.
MOLR	Oversees mineral surveys and appraisals, including utilization plans, grants licenses for mineral exploration and production, and administers the registration and assignment of exploration and production licenses.
MOWR	Supervises China's hydropower development and oversees the safety issues involved in building dams. In addition, it is in charge of reviewing and approving large or medium scale dam projects.
MOT	Supervises and coordinates energy transportation by road and water.
MOR	Supervises and coordinates energy transportation by coal.
MOA	Supervises the development and utilization of renewable energy in China's rural areas.
MOFCOM	Sets quotas and issues licenses for energy imports and exports. Regulates foreign investment in China's energy sector and China's investment on the international energy market.
MOLS	Determines and regulates the income distribution and pension plans of the employees of state-owned energy companies.
MOP	Determines the personnel structure and managerial appointment of state-owned energy companies.
MOST	Supervises R&D in the energy sector and promotes new energy technology development.
MOF	Promotes renewable energy development through tax credit and financial subsidies.
SEPA	The chief government agency responsible for environment issues in China.

Impairing Energy Security Strategy

The way energy institutions are structured and operate in China predisposes the country toward a series of loosely connected policies that are inconsistent, short-sighted and ad hoc, precluding them from producing any coherent and long-term national energy strategy.

First, current energy institutions prevent China from effectively planning its energy future. By replacing energy specific line ministries with state-owned energy companies or transferring their activities to local governments, the central government has essentially given up its control over individual energy sectors. Also, by partitioning authority over energy policy into thirteen parallel ministerial organizations, the government has created a system in which no single bureaucracy has a political upper hand over others. The result is a system with 'too many cooks in the kitchen', leading to severe fragmentation of China's energy policymaking process. The resulting fragmentation of decision-making at both vertical and horizontal levels creates the 'rules of the game' in China's political system requiring negotiation and bargaining that is often protracted and inconclusive.[19] A case in point is the debate in China about whether to impose a fuel tax. The issue was raised in 1999 and debated numerous times, but no consensus has been reached between the Ministry of Finance, the Ministry of Transportation, the Ministry of Agriculture and the State Administration of Taxation (SAOT). Although the imposition of a fuel tax would greatly help to correct the skewed pricing structure and encourage demand-side conservation of oil in China, a goal that is line with China's energy security, the awkward balance of winners and losers among the horizontal institutions involved has so far prevented any policy from materializing. [20]

The process of institutional reform and reorganization has revealed enormous path dependence.

With competing institutional interests unable to reach compromise, many of the thorny decisions are foisted on the country's leadership to solve, who invariably become overloaded. The limited capacity for intervention from the country's top leaders results in a state of inertia with the status quo characterizing the reform process in China's energy industry. Thus, rather than being proactive, the top leadership is forced to be reactive to challenges to the country's energy security.

The various institutional reforms have also led to a progressive weakening of the central government's ability to formulate national energy strategies.[21] Frequent restructurings have drained the central government of talent with human resources increasingly going to state-owned companies, representative offices in Beijing, and foreign enterprises. Consequently, the level of competency within the central government has declined while those organizations to which good talent has gone have enhanced their lobbying power at the central level.

The present state of the NDRC's Energy Bureau is a salient example of the central government's critical deficiency as an effective policymaker. The Energy Bureau is only one of over 20 sub-departments under the NDRC, and is staffed by 30 people. Similarly, the National Statistical Bureau, charged with handling energy data of the world's second largest consumer of energy, has a three-person staff.[22] By contrast, the United States, the world's top energy guzzler, has a 14,000-strong Department of Energy, of which approximately 2,000 staff map out policy and 600 collect and analyze data. The 30 people within China's Energy Bureau are overwhelmed by the deluge of daily project reviews and approvals, and have little time for drafting the country's energy policy or strategy.

China's past bureaucratic reshuffling has also created an interchange of personnel between government and industry that deeply conflicts with a pursuit of true reform such as the ability of an individual to move from a state-owned energy company to a regulatory body. For example, Chen Jinhua, former CEO of Sinopec became the director of the SPC between 1993 and 1998. Similarly, after the 1998 government restructuring, Sheng Huaren, CEO of Sinopec, became director of the SETC between 1998 and 2001. And vice versa, transfer from the line ministry to a state-owned energy company is another form of institutional exchange. Wang Tao, following his post as head of the petroleum ministry (between 1985 and 1988), became the CEO of CNPC. Finally, transfers have also occurred from the energy industry to one of the 11 horizontal ministries. The interchange of personnel has forged linkages between the government and the state-owned energy companies, ensuring the latter's influence on the former and thus forestalling any policy reform that is not in the interest of the ministries or national energy companies. At the same time, as inheritors of these linkages, the state-owned energy companies have used them to thwart reforms that curb their monopoly status. Consequently,

both government and industry are captured by these linkages and only support policies and reforms in their own interest. Decision-making is therefore ad hoc, reactive and supports the status quo. [23]

Cyclical Traps

Institutional failings also contribute to the country's cyclical energy insecurity in the form of power shortages. [24] Overinvestment by local governments, which have led to unsustainable growth and an unexpected demand for energy, has been blamed for the recent power shortages. This rationale is flawed, however, as China has sufficient coal to generate power to fuel the economy. Power shortages in some parts of China, such as the Pear River Delta area which is located far from the coal mines, can be explained in part as the result of transportation bottlenecks. However, recent power shortages swept more than two-thirds of China's provinces and localities, wreaking enormous havoc on the country's economy.[25] Power shortages of that magnitude indicate larger systemic problems that cannot be explained by local government overinvestment.

In reality, two institutional factors in the electricity sector contributed to China's recent cyclical energy insecurity. Foremost, the SDPC made a colossal blunder when drafting the country's electricity development plan following the Asian Financial Crisis. Based on then-current growth rates, the SDPC issued a policy of disallowing any coal-fired power plants for three years. As a result, investment in the power sector precipitously declined, leading to huge decreases in power capacity. [26] With rapidly rising demand for electricity far surpassing investment, power shortages emerged in 2002 and worsened thereafter.

Friction between coal prices and electricity tariffs exacerbated the power shortages. Two coal markets operate in parallel with each other in China: the first brings together large state-owned coal mines and coal consumers under long-term contracts; the other coal market is local, with coal mines producing an average of only a few hundred tons of coal per annum for small industrial, residential, and commercial consumers.[27] The large coal market accounts for 60 percent of the country's total coal production and is subject to government price controls while the small coal market, accounting for 40 percent of the country's total coal production, sells at market prices.[28] The price differential between the two can be as large as 100 RMB per ton (about $12.5 per ton).[29]

Power shortages have driven up coal prices on the market, with demands by state-owned coal producers to fairly benefit from the shift in prices. However, as power producers are also restricted by electricity price fixing, they refused to pay higher cost for coal. This struggle between power producers and coal producers has aggravated the power shortages.

Market Disincentives

A number of pricing distortions and import quota systems also work against China's oil security. The price structure of the Chinese oil market creates perverse incentives and has contributed to the recent artificial shortages of gasoline and diesel in Southern China.[30] The suppression of domestic fuel prices leads to inefficiency and even encourages consumption at a time when the country is increasingly dependent on foreign oil. In addition, by keeping the retail prices low, the country's downstream sector is put under strain because they must buy crude from the international oil market. This is true for Sinopec, which is the country's largest refinery. Crude supply from domestic oil fields controlled by Sinopec only accounts for half of the company's refinery needs. As a result, Sinopec has to pay the international price for its imported crude but sell its refined products at a domestic price – a money losing situation.[31] Therefore, when international prices are high (often the result of rising demand by China itself) there are disincentives for refineries to sell their products domestically. With cruel irony, China's exports of diesel and gasoline actually went up at the same time that fuel shortages were hitting China's south and east in 2004. Moreover, 1,200 tons of oil products were reportedly smuggled out of China every day during the period of peak fuel shortages in Guangdong Province.

The price structure of the Chinese oil market creates perverse incentives.

The monopoly enjoyed by the three state-owned oil companies – CNPC, Sinopec, and CNOOC – also often work against China's oil security. The monopoly makes it difficult for private oil companies in China to bring more oil supply to the market. Specifically, exploration rights are monopolized by the three big oil companies, thus private oil companies in China either concentrate on the downstream sector or invest in the upstream projects abroad. With little access to upstream supply, private companies must pay high prices for

crude and sell their refined products at low domestic prices. Unlike Sinopec, however, they do not receive government subsidies. Consequently, high international prices swiftly put them at risk of bankruptcy, making the entire private sector and the competitive environment extremely fragile.

A number of dangers result from the irrational quota system as well. The primary problem is that the majority of the import quota is controlled by the big three oil companies, Sinochem and their joint ventures. If private or smaller companies obtain import quotas or produce oil overseas, they must sell crude to refineries owned by these major enterprises, essentially discouraging the private oil companies from investing abroad and bringing more oil back to China. This regulatory framework even extends to the larger enterprises. For example, before 2004, CNOOC could only import 4 million tons of crude oil because of their import quota allocation, creating the paradoxical situation where CNOOC was forced to sell the majority of equity oil to the international oil market instead of the Chinese market where demand was rising at unprecedented rates.[32]

Institutions Born Again?

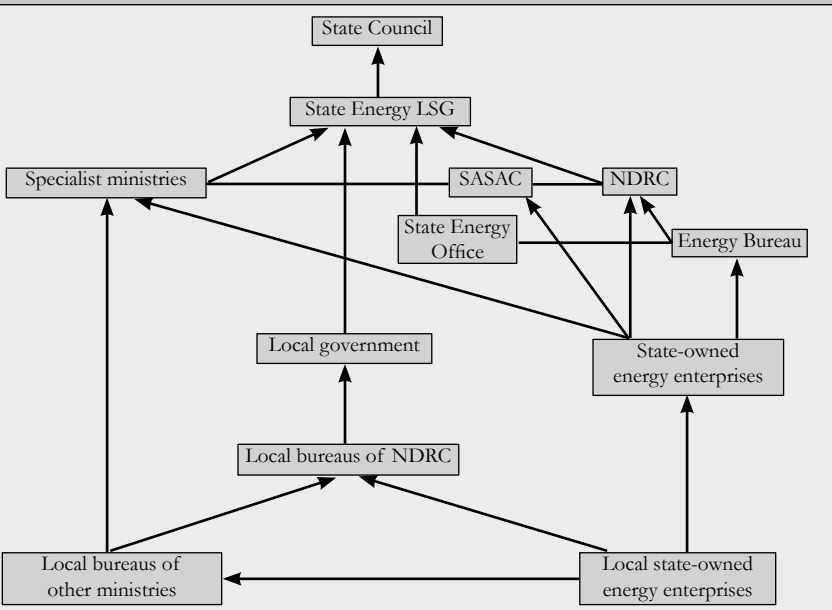
A series of developments over the last couple of years have seriously shaken the country's energy economy and have begun to elicit systemic change. This stems, in large part, from increasingly more energy crises than the country has previously witnessed. The power shortages that swept more than two-thirds of China's provinces and municipalities since 2002 have forced millions of households to suffer blackouts and brownouts and have brought hundreds of factories to a standstill, causing estimated economic losses of up to 1 trillion RMB ($125 billion) between 2000 and 2005. [33] These power shortages triggered a widespread energy squeeze across the country and led to the hording of coal by many local governments and enterprises. The overwhelming demand for coal created bottlenecks in the country's railway system, which in turn exacerbated existing shortages. Without access to adequate coal supply, many regions, particularly the Pearl River Delta area, resorted to oil and gas to generate power. These acute shortages caused ripples to other areas of energy demand including petroleum products (such as diesel) to produce electricity, competing with demand at the pump. All of this has led to sharp growth of energy imports, with annual crude imports registered at 15, 31 and 35 percent for 2002, 2003, and 2004 respectively. [34]

This sharp growth in energy demand has not only pushed up the country's growing dependence on foreign oil but has also been a main culprit in the recent hike in the world oil prices, all of which challenges China's ability to withstand possible supply disruptions and price shocks. The U.S. campaign against Iraq in late 2002 and its expected effect on world oil prices and global oil supply heightened the sense of urgency over energy security within China's leadership. [35] Taken together, the above developments seemingly place China on the edge of, if not already in the middle of, an energy crisis. [36]

Yet, this atmosphere of crisis may be a blessing in disguise. It serves to highlight the country's vulnerabilities to domestic and international energy supply systems and thereby awaken the Chinese leadership to the enormity of the challenges facing the country. Consequently, energy security is now firmly at the top of the leadership's domestic and foreign policy agenda and has prompted the government to tackle some of the issues related to the institutional arrangements of the country's energy industry.

Importantly, the government has had another go at strengthening the policy-making functions of China's energy institutions. In May of 2005, the

Chart 2 Structure of China's energy institutions after 2005



State Council issued Document No. 14 that established a State Energy Leading Small Group (LSG), which is headed by Premier Wen Jiabao with the assistance of two Vice Premiers – Huang Ju and Zeng Peiyan – and is comprised of 13 top leaders from the country's major ministries and administrations. This is the first time since 1993, when the Ministry of Energy was dissolved, that a central body has been inaugurated to be in charge of China's overall energy policy. The State Energy LSG, however, does not meet on a routine basis. To support its routine work, the central government subsequently set up a 24-member State Energy Office, headed by Ma Kai, head of NDRC, and aided by Ma Fucai, former general manager of CNPC.[37]

In addition to restructuring the country's energy policymaking system, the central government also shored up the regulatory power of the State Electricity Regulatory Commission (SERC). Although the SERC was created to regulate the power sector, the authority over electricity price-setting resides with the NDRC. Under this system, SERC has been very weak. With the power shortages of 2004, China's leadership is convinced the NDRC alone is not able to deal with China's cyclical energy crises. As a result, the government has recently clarified the functions between the SERC and NDRC, with the former responsible for regulating and issuing permits to conduct business operations in the power sector and the latter governing review and approval of power projects. The NDRC must also consult with the SERC before adjusting electricity prices nationwide.

Breaking the Back of Monopolies

There has also been a concentrated effort to dilute the monopolies enjoyed by China's major oil companies, with the aim of boosting their domestic and international competitiveness and their ability to secure the country's oil security. To accomplish this, the central government has blurred the lines of business and operation. For example, offshore E&P was previously dominated by CNOOC, but in 2004 CNPC and Sinopec received authorization to operate in the South China Sea and East China Sea. In a similar fashion, CNOOC has made forays into onshore development, which was once the sole purview of CNPC and Sinopec.[38] With similar motivations, the government has also encouraged all state-owned oil companies to become fully integrated companies – similar to major international energy companies. The downstream sector was traditionally dominated by Sinopec and CNPC, but CNOOC has made

inroads here as well by starting the construction of a refinery in Huizhou, Guangdong Province. Exclusive international oil trading rights held by CNPC, Sinopec and Sinochem ended in May of 2004 when CNOOC won authorization to import oil. This ended the irony that CNOOC had to sell its equity oil on the international market. Similarly, both CNPC and Sinopec are starting to make forays into the LNG business, which was formerly dominated by CNOOC while Sinochem received authority to invest in overseas upstream acquisitions in 2001.

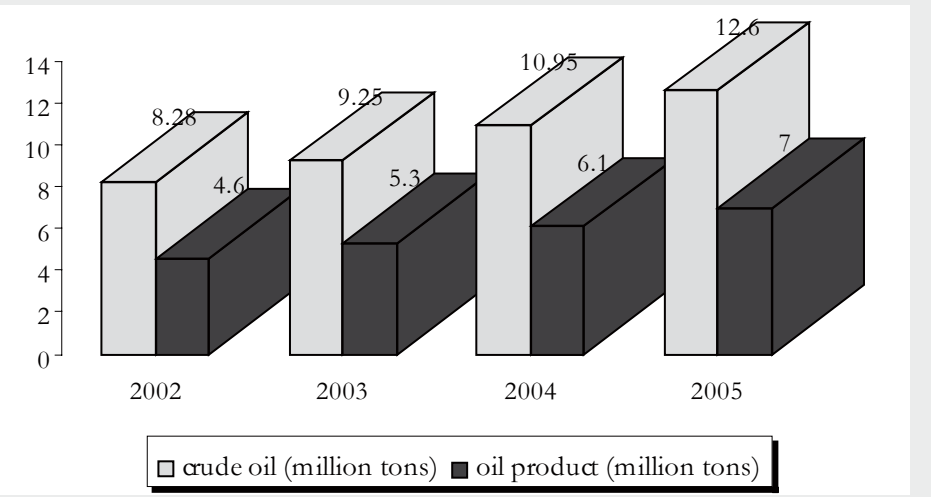
The energy crises of the past several years may be a blessing in disguise as it serves to highlight the country's vulnerabilities to energy supply.

China also began seriously opening its domestic oil market both to honor its WTO obligations and to increase the number of competing players to secure oil for the country. To these ends, deregulations took place in three areas. First, the central government increasingly relaxed restrictions on non-state owned oil companies, granting them import quotas for oil and oil products for the first time in 2002. Since then, they have imported 8.28 million tons of oil and 4.6 million tons of oil products raising their share of these imports by 15 percent.

The central government has also opened the retail market of petroleum products to foreign oil companies, paving the way for some of the largest foreign investments in China's domestic energy industry. Many international concerns have responded to this new policy with plans to open thousands of gas stations jointly with China's oil majors. Statistics show that BP, Exxon Mobil, Shell and Total SA have all been approved to set up 3,600 gas stations altogether in cooperation with Sinopec and CNPC in northern China as well as in the Jiangsu, Zhejiang, Fujian and Guangdong provinces. [39]

The upstream oil and gas sector is gradually being exposed to private investment as well. On Feb. 24, 2005, the central government issued the report, "Opinions of the State Council on Encouraging, Supporting and Guiding the Development of Private and Other Non-Public Economic Sectors." [40] This is the first policy document to promote the development of private enterprises in this sector since 1949 and it marks the important step toward rectifying the irrational circumstance in China where domestic capital is disallowed from investing in certain areas where foreign capital is allowed. More importantly,

Chart 3 Imports of oil and oil product by non-state owned oil companies since 2002 in China[41]



it granted private capital the right to conduct oil E&P and mining. To echo this new round of deregulation in the energy sector, the Great Wall United Petroleum Company (GUPC), China's first independent oil group that represents more than 30 domestic privately-owned oil firms, was formed on June 29, 2005.

Finally, the energy shortages have led to progress in risk management. The central government has both promulgated detailed contingency plans and established a State Contingency LSG under SERC to deal with potential massive blackouts. [42/43] Similarly, perceived threats to oil supply and price stability have also quickened the government's pace to create mechanisms to reduce risks to the country's oil security by approving and initiating construction of four SPR cites in Zhenhan, Zhoushan, Dalian and Huangdao. Furthermore, a fuel oil future exchange was set up in the fall of 2004 to better manage the negative impacts of price fluctuations.

Whither China's Energy Institutions

The latest efforts by the central government to restructure both the energy policy making system and the energy markets should be lauded as constructive change, but neither move has fundamentally tackled the real hurdles

to greater energy security. Of the highest priority is the enduring lack of decisive leadership with the energy institution in China. Although headed by two premiers and including top leaders from 13 ministerial agencies, the State Energy Leading Small Group (LSG) is not a true policymaking body. Instead, its primary tasks are to research a national blueprint for an energy strategy including energy development, conservation, emergency systems as well as international cooperation within the energy sector. It also provides consultation to the State Council for policy formation.[44] Clearly, under this mandate, the LSG and its acting agency, the State Energy Office, is more of a high-level research group and advisory council than a driving force in energy policymaking. With the absence of such a body, the existing problems of fragmentation and compartmentalization will continue to plague China's energy institutions.

One radical solution to this paramount issue would be to reestablish a powerful Ministry of Energy. However, several major factors would invariable work against this option. At a minimum, the redistribution of power and resources that would result in establishing a new energy ministry would incur formidable resistance by the 13 parallel ministerial organizations and the mighty state-owned energy companies. This reality alone effectively makes establishing such an institution a non-starter. Even if it did go through, chances are that some form of accommodation would likely be necessary with these two bureaucracies as well as local governments, making the ministry a mere symbolic head at best or, at worst, further fragmenting the policymaking architecture. Conversely, if concentrating the authority over coal, oil, gas, and power into one administrative body was successful, the energy ministry could become a super-institution with unprecedented power. Given the incomplete deregulation of the energy sector, such a body may only increase heavy-handed administrative intervention, thus further hindering the country's energy security. Hence, before these issues are sorted out, reestablishing the Ministry of Energy in the current environment will remain a distant and perhaps inadvisable option.

Without a powerful policymaking body, the existing problems of fragmentation and compartmentalization will continue to plague China's energy institutions.

Alternatively, incremental change to the existing institutional arrangements is feasible. The government should clearly delineate energy policy making,

implementation, and industry regulatory functions. Since reestablishing an energy ministry in the short term is very unlikely, the government should transform the State Energy LSG into a full-fledged national policymaker rather than a consulting body. This may be feasible if Premier Wen Jiabao instills it with sufficient political leadership and helps facilitate coordination between the 13 relevant parallel ministries and their energy portfolios. The success of the State Energy LSG requires formalizing its agenda and instituting frequent meetings on a minimum quarterly basis to decide on long term national development goals and energy security. Implementation can be carried out by existing institutions with the State Energy Office responsible for fulfilling long-term energy strategies, and the Energy Bureau responsible for overseeing short-term energy policies.

While policymaking authority should remain concentrated at the central level, regulation can be delegated. In addition to SERC, the country needs regulatory commissions for all other sectors of the energy industry, including oil, natural gas, coal, nuclear power and renewable energy sectors. The Energy Bureau can reduce its administrative burden and let these regulatory commissions supervise the country's energy market and deepen the country's energy market liberalization. This will not only allow the Energy Bureau to focus on project review and project approval but also prevent the energy market regulatory bodies from being captured by the country's powerful energy industry.

However, further restructuring is necessary before these independent regulatory commissions can function effectively. Foremost in this regard, the central government must reclaim the regulatory power that was previously transferred to the powerful state energy companies and local governments. This problem is clearly demonstrated by the regulatory capture CNPC and CNOOC have over cooperation with foreign oil companies for onshore and offshore E&P. In an attempt to protect their own turf, these companies are often reluctant to open exploration plots to foreign interests and as a result obstruct not only badly needed foreign investment but also slow domestic energy production. Other facets of this irrational, anti-competitive system are currently manifested. CNPC and Sinopec recently obtained some offshore acreage for E&P. However, offshore development requires a partnership with a foreign oil company. Based on China's regulations, CNOOC remains the sole official partner for foreign companies to develop China's offshore resources. [45] Consequently, neither CNPC nor Sinopec has made significant headway in exploiting their offshore acreage.

Whether China reforms the regulatory or policymaking institutions, the Chinese government must expand the personnel and resource capacity of China's energy governance. Currently, at the national level, less than 170 people are working to solve the enormous energy challenges for a population of 1.3 billion people.[46] Undoubtedly, this is a recipe that all but guarantees failure. An immediate and substantial increase in the number of staff members working on the country's energy policy, particularly the staff level at the Energy Bureau, is long overdue.

The central government should also take steps to reduce administrative controls, market monopoly, price distortions, and import quota in order to

The Environment Imperiled

In 2003, a bitter struggle ensued over the building of a series of dams in the middle and lower reaches of the Nu River in Yunan Province. The State Environment Protection Agency (SEPA), the designated central institution tasked with protecting China's environment vigorously opposed the project based on broad environmental concerns against powerful private power generation interests backed by local governments. This case brought to light a number of debilitating institutional problems with regard to safeguarding China's environment.

At the central level, SEPA is forced to cooperate with other ministries on environmental issues. As a result, the agency often cannot decree a stop to projects that fall short of its environmental standards and are approved by other ministries. To further complicate this conflicting institutional climate, SEPA's national authority is undermined by its limited authority over offices at the local levels. Local bureaus answer only nominally to national SEPA because they are required to report to a separate vertical system under the control of local governments. This is largely because local governments decide both the personnel and budget of the local bureaus of the SEPA. Not surprisingly, as the latter is beholden to the local governments for their wages, facilities, career growth and benefits, they are rather powerless. A natural dilemma arises for all local SEPA bureaus when projects with environmental protection issues compete with local employment and economic growth.

foster an institutional environment conducive to the country's energy security. Although private investment has been welcomed in the domestic oil and gas sectors since early 2005, administrative controls by state-owned oil companies have so far blocked any significant private participation. A case in point is the failure of the Great Wall United Petroleum Company, China's first private oil group, to acquire a permit to engage in exploration, wholesale, retail, and import of crude/oil products. Consequently, GUPC has become merely a figurehead. By contrast, state-owned energy companies enjoy exclusive oil and gas exploration rights, controlling 99.6 percent of the country's total exploration acreage. Unfortunately, stewardship over these precious resources by state companies is critically flawed. In a 2003 annual review of the 875 exploration projects controlled by state companies, 45 percent did not receive the required minimum investment and 36 percent received no investment at all. [47] Therefore, the government should strictly stipulate that all energy development projects that do not receive minimum investment be subject to auction on the market and permits awarded to private oil companies that have enough capital and technology.

The Chinese government must expand the personnel and resource capacity of China's energy governance.

Private domestic oil companies should also be actively encouraged to join the 'go out' campaign by investing overseas. This will simultaneously boost the country's oil supply and help to redress accusations targeted at China's state-owned oil companies for their controversial investment strategies. To accomplish this, the government will need to gradually eliminate import quotas and regulation barriers to private interests.

Finally, the government should further strengthen the country's energy risk management mechanism. The development of the strategic petroleum reserve is an urgent goal and one to which private oil companies can contribute. An expansion of the country's futures market from its present narrow coverage of fuel oils to a broader platform including crude oil would help China manage risk to price instability. Additionally, in the long term the government can look to closer collaboration with the International Energy Agency to tap into its risk management mechanisms.

Energy institutions manage and regulate the complex components of the country's energy industry. Unfortunately, the configuration of that body has largely constrained the country's ability to meet the challenges of cyclical power

shortages, oil insecurity, and environmental degradation. The size and path dependent nature of the energy bureaucracy makes any revolutionary reform to China's institutional culture difficult, and perhaps, impossible. Incremental change is possibly the only hope for China's system. Alternatively, energy crises may be the only viable stimulus to push reform of China's energy institutions through to completion. While restructuring of these institutions may be doubtful, it will be absolutely vital to the nation's energy security. Thus far, China has muddled through and may be lucky enough to avert an energy crisis without deep institutional reform. But that would be betting on an unacceptably uncertain future.

Notes

[1] Energy Information Administration, "International energy outlook 2006," U.S. Department of Energy, Washington, D.C., Jun. 2006, p. 83.

[2] Although there are some excellent studies on the evolution of institutional arrangements in China, they fail to explain the effect of energy institutions on the country's energy security. Several examples of the previous studies include: Philip Andrews-Speed, *Energy Policy and Regulation in the People's Republic of China*, *International Energy and Resources Law and Policy Series,* The Hague, *London/New York: Kluwer Law International*, 2004; Michael E. Arruda, "China energy sector survey Part II: The energy institutions," *China Law & Practice,* Dec. 2003/Jan. 2004; Leland R. Miller, "In search of China's energy authority," *Far Eastern Economic Review 169*, No. 1, Jan./Feb. 2006; Jimin Zhao, "Reform of China's energy institutions and policies: Historical evolution and current challenges," in *BCSIA Discussion Paper 2001-20, Energy Technology Innovation Project,* Cambridge, MA: Kennedy School of Government, Harvard University, 2001.

[3] Zhang Kang, Zhou Zongying, and Zhou Qingfan, *The Development Strategy of China's Oil and Gas,* Beijing: Archeology Press, Petroleum Industry Press and China Petrochemical Press, 2002, pp. 487-90.

[4] For a detailed account on the reforms of China's energy institutions, see: Zhao, "Reform of China's energy institutions and policies: Historical evolution and current challenges."

[5] Andrews-Speed, *Energy Policy and Regulation in the People's Republic of China*, p. 27.

[6] Ibid., chapter 12.

[7] These five power-generating companies include China Datang Corporation, China Huaneng Group, China Huadian Corporation, China Guodian Corporation, and China Power Investment Corporation. The two grid companies are State Grid Corporation of China and China Southern Power Grid. Sinohydro Corporation, China Gezhouba (Group) Corporation, China Power Engineering Consulting Group Corporation and China Hydropower Engineering Consulting Group Corporation are the four services companies.

[8] Andrews-Speed, *Energy Policy and Regulation in the People's Republic of China*, p. 27.
[9] "The State Power Corporation of China reorganized into 11 companies"*, China.org.cn*, Dec. 29, 2002, See: http://www.china.org.cn/chinese/2002/Dec/253844.htm.
[10] Wang Qingyi, "China's coal industry: Its evolution and prospect (Part 2)," *China Coal* 27, No. 2, 2001, p. 8.
[11] Andrews-Speed, *Energy Policy and Regulation in the People's Republic of China*, p. 181.
[12] The Editorial Committee of China's Energy Development Report, *China's Energy Development Report,* Beijing: China Metrology Press, 2003, p. 109.
[13] "The power over coal prices will be completely deregulated and the ordering pattern will fade out", *xinhuanet.com*, Dec. 17, 2005, See: http://news.xinhuanet.com/fortune/2005-12/17/content_3933969.htm.
[14] For how the operation of small coal mines affect the accuracy of China's energy statistics, please refer to Jonathan E. Sinton, "Accuracy and reliability of China's energy statistics", *China Economic Review*, No. 12, 2001. Jonathan E. Sinton and David G. Fridley, "Comments on recent energy statistics from China", *The Sinosphere Journal 6*, No. 2, 2003.
[15] For a background on the 14 reorganizations of Chinese government, please refer to "Government restructurings since new China was established"*, xinhuanet.com*, Mar. 4, 2006, and Mar. 6, 2006, See: http://news.xinhuanet.com/zhengfu/2003-03/04/content_756385.htm and http://news.xinhuanet.com/zhengfu/2003-03/06/content_761540.htm.
[16] The most important example is the multiple restructurings of China's national energy planning institution. The State Planning Commission (SPC) was established in 1952 with the charge of China's strategic energy development and regulating the energy industry. It was split into the SPC and the newly instituted State Economic Commission (SEC) in 1956, with the former still in charge of the country's long-term planning and the latter implementing the country's annual energy targets. However, the SPC regained its former power in 1988 by a merger with the State Energy Commission in 1993, only to lose both its energy industry regulatory power and its responsibility for implementing annual planning targets to the State Economic and Trade Commission (SETC) in the massive government restructuring of 1998. This new organization was renamed the State Development and Planning Commission (SDPC), but was reorganized into the National Development and Reform Commission (NDRC) in 2003 and won back its regulatory power over the energy industry when the SETC was dissolved in 1998. Also, the NDRC shares its authority with SERC, which performs some of the regulatory functions in the power sector.
[17] For more about path dependence in institutional change, see: North, *Institutions, Institutional Change and Economic Performance*, chapter 12.
[18] In his article on the energy institutions in China, Michael Arruda touched upon the responsibilities and functions of some the 12 institutions. See: Arruda, "China energy sector survey Part II: The energy institutions." But his list is far from complete. For the official description of the responsibilities and functions of different ministries of the Chinese government, please refer to Zhongguo Zhengfu Wang (the official website of

the Central People's Government of People's Republic of China), See: http://www.gov.cn/wsfw/index.htm.

[19] Xiong Wenzhao and Zhang Wei, "Prevent the compartmentalization of China's national policy", *The Outlook Weekly*, 2006, See: http://news.sohu.com/20060521/n243333237.shtml.

[20] For a special coverage on fuel tax, please refer to a collection of reports carried by China5e.com, See: //202.114.65.37/KNS50/download.aspx?filename=CCBH0206.GMRB20020325Z327&tablename=CCND2002&dflag=pdfdown.

[21] Ding Ningning, The Experience and Lessons of China's Government Restructurings since its Economic Reform*, Guoming Guancha Kan*, May 28, 2006, See: http://guancha.gmw.cn/show.aspx?id=8349.

[22] Bo Kong, "An anatomy of China's energy insecurity and its strategies", *Pacific Northwest National Laboratory, Seattle: Pacific Northwest Center for Global Security*, 2005, p. 23.

[23] For more on how major players in China's energy industry use their excessive power to manipulate the country's reforms in the industry, see: Andrews-Speed, *Energy Policy and Regulation in the People's Republic of China*, chapter 10.

[24] For reasons why power shortages in China are defined as cyclical energy insecurity, see: Kong, "An anatomy of China's energy insecurity and its strategies", pp. 3-6.

[25] Ibid., for a more detailed account of how the recent power shortages affected the Chinese economy.

[26] "Electricity shortage in 2004: 30 percent natural disasters and 70 percent human errors", *xinhuanet.com*, Dec. 22, 2004, See: http://news.xinhuanet.com/stock/2004-12/22/content_2366867.htm.

[27] Sinton, "Accuracy and reliability of China's energy statistics", and, Sinton and Fridley, "Comments on recent energy statistics from China."

[28] The power over coal prices will be completely deregulated and the ordering pattern will fade out", *xinhuanet.com.*

[29] Ibid.

[30] At present, the retail and wholesale price of oil in China is based on the weighted average of prices in New York, Rotterdam and Singapore. The retail price is set at 5.5 percent higher than the wholesale price (which is allowed to fluctuate +/- 8 percent after the retail price is fixed). Lan Xinzhen, "Prospecting the local oil market", *Beijing Review*, May 17, 2005, See: http://www.bjreview.com.cn/En-2005/05-17-e/bus-1.htm.

[31] By some estimates, for every ton of refined products it sells, Sinopec loses 230 yuan ($28.75 USD). Zuo Xiaolei, "Institutional costs cause losses-Pros and cons of the $10 billion subsidy to Sinopec", *china5e.com*, 2006.

[32] In April 2004, CNOOC and Sinopec established a joint venture (CNOOC-Sinopec International Trading Limited), whose quota was increased. "CNOOC obtains the right to import 12 million crude oil per year", *china5e.com*, 2004, See: http://www.china5e.com/news/oil/200406/200406210245.html.

[33] "Electricity shortage in 2004: 30 percent natural disasters and 70 percent human errors". For a detailed study of how the recent power shortages affect China, see: Kong, "An anatomy of China's energy insecurity and its strategies."

[34] Author's calculation based on statistics from General Administration of Customs of People's Republic of China.
[35] Li Yige, "The suspense of the U.S. War against Iraq: Will the 70,000 barrels of oil be shipped to China safely?", *People's Daily* online edition, Feb. 19, 2003, See: http://past.people.com.cn/GB/Jinji/20030219/926361.html.
[36] In fact, some analysts and media in China already characterized the recent energy pinch in China as an "energy crisis." However, others objected to this characterization and maintained that it exaggerated the seriousness the recent energy shortages in China.
[37] For detailed information about Office of the National Energy Leading Group, please visit its official website: http://www.chinaenergy.gov.cn/index.php?id=1.
[38] For example, recently the local government of Inner Mongolia agreed to allow CNOOC to develop its resources. For more, see: "Inner Mongolia signed an agreement with CNOOC to develop and utilize resources", *China Land & Resource News*, July 12, 2004, See: http://www.clr.cn/frontNews/chinaResource/read/news-info4.asp?ID=25383.
[39] Lan Xinzhen, "Prospecting the local oil market", *Beijing Review*, May 17, 2005.
[40] "Opinions of the State Council on encouraging, supporting and guiding the development of private and other non-public economic sectors", *Xinhua News Agency*, Feb. 25, 2005, See: http://news.xinhuanet.com/fortune/2005-02/25/content_2616929.htm.
[41] Based on data published by China's Ministry of Commerce.
[42] "Circular on establishing State Emergency Leading Small Group to deal with massive blackouts", State Electricity Regulatory Commission, July 15, 2005, See: http://www.serc.gov.cn/opencms/export/serc/bulletin/tongzhi/news/tongzhi000013.html.
[43] "Authorized release: State Contingency Plans to deal with events of massive blackouts", *Xinhua News Agency*, Jan. 23, 2006, See: http://news.xinhuanet.com/politics/2006-01/23/content_4090776.htm.
[44] "Wen Jiaobao heads the newly established State Energy Leading Small Group", *People's Daily*, May 30, 2005, See: http://politics.people.com.cn/GB/1026/3426700.html.
[45] Based on "Regulations of the People's Republic of China on the exploitation of offshore petroleum resources in cooperation with foreign enterprises", promulgated by the State Council on Feb. 10, 1982. Also see: "The Decision on revision of the regulations of the People's Republic of China concerning the exploitation of offshore petroleum resources in cooperation with foreign enterprises", Decree No. 318 of the State Council, Sept. 23, 2001.
[46] 170 people includes 16 people on the State Energy LSG, 24 people at the State Energy Office, 30 people with Energy Bureau, and 98 people with SERC.
[47] "What is behind the Gas Shortages?", *China Land & Resource News*, Jan. 20, 2006, See: http://news.mlr.gov.cn/frontNews/chinaResource/read/news-info4.asp?ID=77317.